IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Applicants: Daniel Mark Coffman et al. Examiner: Siedler, D.

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For: AUTOMATIC CLARIFICATION OF COMMANDS IN A CONVERSATIONAL NATURAL LANGUAGE UNDERSTANDING SYSTEM

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APPEAL BRIEF

Applicants appeal the status of Claims 1-29 as rejected in the non-final Office Action dated April 27, 2007, the final Office Action dated September 25, 2007, the Advisory Action dated November 27, 2007, and the non-final Office Action dated March 4, 2008, pursuant to the Notice of Appeal filed concurrently herewith and submit this appeal brief.

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1. Real Party in Interest

The real party in interest is INTERNATIONAL BUSINESS MACHINES CORP., the assignee of the entire right title and interest in and to the subject application by virtue of an assignment recorded with the Patent Office on May 16, 2006 at reel/frame 014679/0278.

2. Related Appeals and Interferences

None

3. Status of Claims

Claims 1-29 are pending, stand rejected and are under appeal.

A copy of the Claims 1-29 is presented in Section 8 below.

4. Status of Amendments

An Amendment under 37 CFR §1.111, electronically filed with the PTO on July 13, 2007 in response to a non-final Office Action dated April 27, 2007, was entered. A Response under 37 CFR §1.116, electronically filed with the PTO on November 5, 2007 in response to a final Office Action dated September 25, 2007, was considered. An Amendment under 37 CFR §1.111, electronically filed with the PTO on December 12, 2007 with respect to a Request for Continued Examination (RCE) and in response to an Advisory Action dated November 27, 2007, was entered. No Responses/Amendments were filed subsequent to the above Amendment electronically filed with the PTO on December 12, 2007. A non-final Office Action dated March 4, 2008, to which this Appeal Brief is directed, is currently pending.

5. Summary of Claimed Subject Matter

Independent Claim 1 is directed to a method for recognizing commands in natural language (Claim 1, preamble).

The subject matter of the first limitation (beginning with "comparing...") recited in Claim 1 is described at least at, e.g.: page 13, lines 7-18. Moreover, the subject matter of the first limitation of Claim 1 involves at least, e.g.: element 102 of FIG. 3.

The subject matter of the second limitation (beginning with "identifying...") recited in Claim 1 is described at least at, e.g.: page 8, lines 10-18; and page 13, line 19 to page 14, line 10. Moreover, the subject matter of the second limitation of Claim 1 involves at least, e.g.: element 104 of FIG. 3.

The subject matter of the third limitation (beginning with "decoding...") recited in Claim 1 is described at least at, e.g.: page 20, lines 11-13. Moreover, the subject matter of the third limitation of Claim 1 involves at least, e.g.: element 114 of FIG. 3.

Independent Claim 12 is directed to a method for recognizing commands in natural language (Claim 12, preamble).

The subject matter of the first limitation (beginning with "providing...") recited in Claim 12 is described at least at, e.g.: page 13, lines 7-18. Moreover, the subject matter of the first limitation of Claim 12 involves at least, e.g.: element 102 of FIG. 3.

The subject matter of the second limitation (beginning with "arbitrating...") recited in Claim 12 is described at least at, e.g.: page 8, lines 10-18; and page 13, line 19 to page 14, line 10. Moreover, the subject matter of the second limitation of Claim 12 involves at least, e.g.:

element 104 of FIG. 3.

The subject matter of the third limitation (beginning with "decoding...") recited in Claim 12 is described at least at, e.g.: page 20, lines 11-13. Moreover, the subject matter of the third limitation of Claim 12 involves at least, e.g.: element 114 of FIG. 3.

Independent Claim 23 is directed to a system for recognizing commands in natural language (Claim 23, preamble).

The subject matter of the first limitation (beginning with "a speech recognizer...") recited in Claim 23 is described at least at, e.g.: page 9, line 19 to page 10, line 9. Moreover, the subject matter of the first limitation of Claim 23 involves at least, e.g.: element 14 of FIG. 1.

The subject matter of the second limitation (beginning with "a dialog manager...") recited in Claim 23 is described at least at, e.g.: page 10, line 18 to page 11, line 18. Moreover, the subject matter of the second limitation of Claim 23 involves at least, e.g.: elements 18 and 20 of FIG. 1.

6. Grounds of Rejection to be Reviewed on Appeal

Claims 1, 4, 10-12, 15, 21-23, and 26 stand rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 6,311,150 to Ramaswamy (hereinafter Ramaswamy).

Claims 5 and 16 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Ramaswamy.

Claims 2, 3, 6, 13, 14, 17, 24, and 25 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Ramaswamy in view of U.S. Patent No. 4,974,191 to Amirghodsi (hereinafter "Amirghodsi").

Claims 7-9, 18-20, and 27-29 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Ramaswamy in view of "A Pervasive Conservational Interface for Information Interaction", Eurospeech 1999, by Ramaswamy (hereinafter "Ramaswamy2").

Claims 1, 12, and 23 are the independent claims pending in the instant application.

Given that a dependent claim includes all the limitations of a base claim from which it depends and, thus, a successful argument with respect to independent Claims 1, 12, and 23 (which have been rejected only under 35 U.S.C. §102(b)) will obviate the rejections of the claims dependent there from (which have been rejected under 35 U.S.C. §102(b) and/or 35 U.S.C. §103(a)), the preceding rejection under 35 U.S.C. §102(b) is presented for review in this Appeal.

Regarding the grouping of the Claims, Claims 2-11 stand or fall with Claim 1, Claims 13-22 stand or fall with Claim 12, and Claims 24-29 stand or fall with Claim 23, due to their respective dependencies.

7. Argument

A. Introduction

In general, the present invention is directed to automatic clarification of commands in a conversational natural language understanding system (Applicants' Specification, Title).

With respect to prior art conversational systems, page 2, line 7 to page 4, line 1 of the Applicants' specification discloses the following:

> Ambiguities may arise from three different sources. The first cause of ambiguity is that a gesture may be very general, possibly applying to several

different aspects of the conversation. This becomes increasingly likely as more and more applications are operative simultaneously. Thus, if the user were to say "Go on to the next one" it is more than likely that several applications could respond to such a command. The user's intended target application was clear to him, however, and must be discovered by the conversational system without merely returning a question to the user requesting clarification, such as "Did you mean your calendar or you inbox?" Such questions quickly become annoying from human interlocutors and even more so from machines.

A second cause of ambiguity is that the user naturally assumes that the system will be able to remember certain aspects of the conversation even when these pertain to different applications. For example, if the user asks "Do I have anything scheduled on Tuesday with Mary?" he will not be surprised if the system needs clarification of the type "Do you mean Mary Smith or Mary Jones?". If the user then poses the request "Send a note to her saying I will be away that day" he will expect that the system will be able to remember that the person in question is the Mary referred to earlier, even though the first use of the name was within a calendar application and the second a mail composition application.

A third cause of ambiguity is that all recognition systems are prone to occasional error. A user may speak unclearly, the environment may be noisy, or the user may use a word unknown to the recognition system. Further, natural language parsing systems incur errors of their own by their very nature: they permit the user to

say whatever he wishes, but this freedom comes at the cost of some mistakes in understanding.

Advantageously, the present principles provide methods (Claims 1 and 12) and a system (Claim 23) to resolve the above described ambiguities (see, e.g., Applicants' specification, p. 8, line 10 to p. 9, line 7).

The claims of the pending application include novel features not shown in the cited references and that have already been pointed out to the Examiner. These features provide advantages over the prior art and dispense with prior art problems such as those described in the background section of the Applicants' specification.

It is respectfully asserted that independent Claims 1, 12, and 23 are each patentably distinct and non-obvious over the cited references in their own right. For example, the below-identified limitations of Claims 1, 12, and 23 are not shown in any of the cited references, either taken singly or in any combination. Moreover, these Claims are distinct from each other in that they are directed to different implementations and/or include different limitations. For example, while Claims 1 and 12 are directed to methods, these claims include different limitations with respect to each other, and Claim 23 is directed to a system. Accordingly, each of Claims 1, 12, and 23 represent separate features/implementations of the invention that are separately novel and non-obvious with respect to the prior art and to the other claims. As such, Claims 1, 12, and 23 are separately patentable and are each presented for review in this appeal.

B. Rejection under 35 U.S.C. §102(b) over U.S. Patent No. 6,311,150 to Ramaswamy

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." MPEP §2131, citing *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

The Examiner rejected Claims 1, 4, 10-12, 15, 21-23, and 26 as being anticipated by U.S. Patent No. 6,311,150 to Ramaswamy (hereinafter "Ramaswamy"). The Examiner contends that Ramaswamy shows all the elements recited in Claims 1, 4, 10-12, 15, 21-23, and 26.

Ramaswamy is directed to a "method and system for hierarchical natural language understanding" (Ramaswamy, Title). In further detail, Ramaswamy discloses the following in his Abstract:

> A method for hierarchical translation of input to a formal command in natural language understanding systems includes presenting an input command to be translated to a natural language understanding engine. At least two translator levels are provided in the natural language understanding engine. A first translator level of the at least two translator levels translates the input command into at least one category by associating the input command with the at least one category for the next level of translators. A formal language command is output for the input command from a last of the at least two translator levels based on the input command and the at least one category.

It will be shown herein below that the limitations of Claims 1, 12, and 23 reproduced herein are not shown in the cited reference, and that Claims 1, 12, and 23 should be allowed including the claims dependent there from as identified in Section 6 herein.

B1. Claims 1, 4, 10-12, 15, 21-23, and 26

It is respectfully asserted that none of the cited references teach or suggest the following limitations recited in Claim 1:

> identifying a winning handler for decoding a command from the utterance, wherein the winning handler is identified by arbitration between results provided by at least two of the plurality of handlers, and the results provided at a first stage by at least one of the at least two of the plurality of handlers include one or more target utterances for the utterance....

Moreover, it is respectfully asserted that none of the cited references teach or suggest the following limitations recited in Claim 12:

> arbitrating against results provided by at least two of the plurality of handlers to determine a winning handler for an utterance, wherein the results provided at a first stage by at least one of the at least two of the plurality of handlers include one or more target utterances for the utterance....

Further, it is respectfully asserted that none of the cited references teach or suggest the following limitations recited in Claim 23:

> a dialog manager comprising a hierarchical ordering of handlers, each handler being trained to be responsive to decoded utterances wherein the dialog manager manages arbitration between results provided by the handlers to determine a winning handler for an utterance and decodes the command in accordance with the winning handler, wherein the results provided at a first stage include one or more target utterances for the utterance.

The Examiner has cited column 2, lines 25-65 of Ramaswamy as disclosing the preceding limitations recited in Claims 1 and 12.

The Examiner has cited column 2, lines 25-65 and column 3, lines 10-20 of Ramaswamy as disclosing the preceding limitations recited in Claim 23.

The Applicants respectfully disagree with the Examiner reading of Ramaswamy.

For example, column 2, lines 25-65 of Ramaswamy disclose the following:

> Another method for hierarchical translation of input to a formal command in a natural language understanding system includes the steps of presenting an input command to be translated to a natural language understanding engine, providing a plurality of translator levels in the natural language understanding engine, providing a plurality of categories for each translator level, each category

including a group of formal language commands stored in at least one model, associating the input command with the categories for a given translator level, scoring a probability of correct translation for each of the at least two categories, selecting a category of the at least two categories yielding a highest score, associating the input command with the selected category for a next level of translators and outputting a formal language command for the input command from a last of the translator levels based on the input command and the selected category.

In other methods, the step of providing a plurality of translator levels may include providing N translator levels where N is defined as a system parameter. Each category may include a subset of formal language commands to narrow a search space for determining the formal language command corresponding to the input command. The step of applying the formal language command to at least one application may be included. The categories may include formal language command entries relevant to at least one application and may further include the step of applying the formal language command entries to the at least one application in accordance with the input command. The at least two categories may include all entries for the input command and may further include the step of associating a first portion of the entries with a given category by providing a formal command for each of the entries relevant for the given category. The step of mapping a second portion of the entries to an error command may also be included. The step of selecting a category of the at least two categories yielding a

highest score may include the step of selecting a category with a lower score if a translation error is encountered for a category or categories yielding a higher score. If a translation error is encountered for all scored categories, a do nothing category may be selected.

Moreover, column 3, lines 10-20 of Ramaswamy disclose the following:

A method for building hierarchical models for translating an input command to a formal command in a natural language understanding system includes the steps of collecting training data from a domain of inputs, separating the training data into translation levels, the translation levels arranged to provide a given output at each level for associating the inputs to a **category**, the training data including the inputs and an associated formal language command for each input, for each translation level, indicating **categories** for searching for a formal language command by dividing up a formal language command search space and associating the categories with each input and associating each input with the formal language command in a last translation level.

Thus, in accordance with the limitations recited in Claims 1 and 12, "the results provided at a first stage by at least one of the at least two of the plurality of handlers include one or more target utterances for the utterance". Moreover, in accordance with the limitations of Claim 23, "the results provided at a first stage include one or more target utterances for the utterance".

In contrast, Ramaswamy does not teach or suggest the preceding limitations of Claims 1, 12, and 23, but instead involves a multi-tiered approach that, at a first stage, only outputs a target category for an utterance, but not a target utterance. From the target category, further stages are performed including in a further stage scoring a probability of a correct translation for each of at least two categories, in a yet further stage selecting a category yielding a highest score, in a still further stage associating the input command with the selected category, and in a final state outputting a formal language command based on the input command and the selected category (see, e.g., Ramaswamy, col. 2, lines 25-40).

In fact, in prior office actions (see, e.g., Office Action dated September 25, 2007), the Examiner even characterized the operation of Ramaswamy in accordance with the Applicants' understanding thereof, explicitly stating on pages 3 and 5 of the Office Action in support of his rejection of Claims 1, 12, and 23 "scores for the probability of a correct translation are determined for at least two categories, then the category having the highest score is chosen and a formal command is output".

While the Examiner has expanded the cited portion of Ramaswamy from column 2, lines 25-40 to now also include lines 41-60 of column 2 of Ramaswamy, the additional cited portion of Ramaswamy still does not disclose the above recited limitations of Claims 1, 12, and 23. For example, while the Examiner has pointed to Ramaswamy disclosing, *inter alia*, "the step of applying the formal language command to at least one application may be included" (Office Action, pp. 2-3, citing Ramaswamy, col. 2, lines 47-49), the cited portion does not overtly or implicitly imply that this step involves providing results **at a first stage** that include one or more target utterances for the utterance, as recited in Claims 1, 12, and 23. Moreover, while the above

cited portion of Ramaswamy is set forth in the background section of his patent and hence is not detailed as the corresponding portion of the detailed description relating to the same, the portions of the detailed description of Ramaswamy (as argued herein) clearly show that Ramaswamy does **not** provide results **at a first stage** that include one or more target utterances for the utterance, as recited in Claims 1, 12, and 23. For example, the Examiner also cited column 5, lines 54-58 of Ramaswamy in the "Response to Arguments" section of the Office Action dated March 4, 2008. Column 5, lines 54-58 of Ramaswamy disclose "[t]ranslators 102 of a hierarchical NLU of the present invention include categorized formal commands. Categories, and nest sub-categories, of the formal commands are defined and each formal command is assigned to one (or more) of these categories and stored in models 104". However, as described immediately there before in Ramaswamy, in column 5, lines 43-50: "Each translator 102 **performs one portion** of the translation process, and narrows down the search space of formal commands to be translated from input text 10 for the subsequent level. Level 1 translator takes in the text input 10 and initiates the translation process, and ***Level N* translator *concludes* the translation process *by producing the formal command* 14 associated with the text input 10**" (emphasis added). With respect to the cited column 5, lines 43-50 of Ramaswamy, which relate to Figure 2 of Ramaswamy, see also, element 208 of Figure 2 of Ramaswamy, which discloses "associate inputs with each category for each level of translation" and element 210 which discloses "**map** category and input text **to formal commands** in each category **at the *last level* of translation**") (emphasis added).

Hence, the approach of Ramaswamy is significantly more complex in all cases, thus requiring more time and resources to achieve a result. In contrast, the present principles as represented by Claims 1, 12, and 23 provide a more efficient approach.

Moreover, in accordance with the limitations recited in Claims 1 and 12, a winning handler is identified for decoding a command from an utterance by arbitration between results provided by at least two of the plurality of handlers. Moreover, in accordance with the limitations recited in Claim 23, a dialog manager manages arbitration between handlers to determine a winning handler for an utterance.

In contrast, Ramaswamy does not teach or suggest the use of arbitration at all, but rather simply selects the category with the highest score. While the Examiner has stated that the Applicant's Specification does not support the definition of arbitration provided in the previous responses, reconsideration of the same is respectfully requested, as the portions of the specification explicitly supporting the definition are also included and clearly show such support. For example, as mentioned with respect to page 14, lines 11, one of two or more handlers may pose the question to another one of the two or more handlers "will you defer". Clearly, such an approach is not strictly score based as is Ramaswamy (highest score selected), but rather involves some discretion. The following is further provided with respect to arbitration not being disclosed in Ramaswamy.

As defined in Webster's New World Dictionary of the American Language, Second College Edition, David B. Guralnik, Ed. in Chief, 1974, p. 70, a copy of which was attached to the Amendment filed on December 12, 2007 in response to the Advisory Action dated November 27, 2007 for the Examiner's convenience, arbitration refers to "the act of arbitrating; specif., the

settlement of a dispute by a person or persons chosen to hear both sides and come to a decision". Also noteworthy, as defined at page 70 of the same, arbitrator refers to "1. a person selected to judge a dispute; arbiter, esp. one, as in collective bargaining negotiations, named with the consent of both sides 2. a person authorized to judge or decide", and arbitrary refers to "not fixed by rules but let to one's judgment or choice; discretionary". Hence, in arbitration, a person or thing acts as a judge to make a choice based on discretion. In contrast, Ramaswamy is not performing arbitration, i.e., is not using discretion, but is instead simply determining a highest scoring category which is hence rule-based (rule = select highest scoring category) and contrary to arbitration. That is, if a rule is simply to be followed (i.e., select highest scoring category) as disclosed in Ramaswamy, then arbitration is not even needed in the first place.

For example, as disclosed in the Applicants' Specification, with respect to an arbitration method (see, e.g., Applicants' Specification, p. 6, lines 7-8, and p. 12, line 30 to p. 13, line 2), a first stage of arbitration may involve posing the question "Do you understand this utterance?" to each handler (Applicants' Specification, p. 13, lines 7-11), a second state of arbitration may involve posing the question "Did you expect this?" to each handler that responded to the question posed in the first stage (Applicants' Specification, p. 13, line 19 to p. 14, line 2), and another state of arbitration may involve posing the question **"Will you defer"** to each of two or more handlers that still express interest in the utterance (Applicants' Specification, p. 14, lines 11-13), and so forth. Hence, each of Claims 1, 12, and 23 expressly recite identifying the winning handler by arbitration, which may involve, for example, a negotiation and so forth between the handlers, and not simply the application of a rule (rule = select highest scoring category) as disclosed in Ramaswamy.

Moreover, while Claims 1, 12, and 23 recite identifying/determining **a winning handler**, the cited portion of Ramaswamy discloses selecting a category (and not a winning handler as recited in these claims). As disclosed at page 8, lines 11-17 of the Applicants' Specification, a handler is a component of a dialog management system that interprets utterances, and not simply a category.

Further, while Claims 1, 12, and 23 recite that the command is decoded **in accordance with the winning handler identified by arbitration**, the cited portion of Ramaswamy discloses that the category yielding the highest score is selected, the input command is associated with the selected category for a **next level** of translators, and the formal language command for the input command is outputted from **a last of the translator levels** based on the input command and the selected category. Hence, even assuming arguendo that Ramaswamy selected a handler (e.g., translator level) as opposed to a category, Ramaswamy would still not teach or suggest the above-recited limitations of Claims 1, 12, and 23 since Ramaswamy does not output a formal language command corresponding to that handler (translator level) but rather then associates the selected category with a **next level** of translators and ultimately outputs the formal language command from a **last level** of translators.

Accordingly, Ramaswamy does not teach or suggest all the above-recited limitations of Claims 1, 12, and 23. Moreover, while not cited against Claims 1, 12, and 23, it is nonetheless respectfully asserted that Amirghodsi and Ramaswamy2 do not cure the deficiencies of Ramaswamy, and are silent with respect to the above-recited limitations of Claims 1, 12, and 23.

Thus, Ramaswamy does not teach or suggest all the above-recited limitations of Claims 1, 12, and 23.

Accordingly, Claims 1, 12, and 23 are patentably distinct and non-obvious over the cited reference for at least the reasons set forth above. Therefore, withdrawal of the rejection and allowance of Claims 1 (and, thus, also Claims 2-11), 12 (and, thus, also Claims 13-22), and 23 (and, thus, also Claims 24-29) is earnestly requested.

F. Conclusion

At least the above-identified limitations of the pending claims are not disclosed or suggested by the teachings of the cited combinations. Accordingly, it is respectfully requested that the Board reverse the rejections of Claims 1-29 as specified herein.

In the event of any non-payment or improper payment of a required fee, the Commissioner is authorized to charge Deposit Account No. 50-0510 as required to correct the error.

Respectfully submitted,

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8. CLAIMS APPENDIX

1. (previously presented) A method for recognizing commands in natural language, comprising the steps of:

comparing an utterance to a plurality of handlers;

identifying a winning handler for decoding a command from the utterance, wherein the winning handler is identified by arbitration between results provided by at least two of the plurality of handlers, and the results provided at a first stage by at least one of the at least two of the plurality of handlers include one or more target utterances for the utterance; and

decoding the command in accordance with the winning handler.

2. (original) The method as recited in claim 1, wherein the step of identifying includes resolving ties in the arbitration between handlers by employing a tie-breaker handler.

3. (original) The method as recited in claim 2, wherein the tie-breaker handler poses a question to a user to determine the winning handler.

4. (original) The method as recited in claim 1, wherein the handlers include an enabled or a disabled state and further comprising the step of presenting the utterance to enabled handlers.

5. (original) The method as recited in claim 4, further comprising the step of submitting

the utterance to disabled container handlers to ensure submission of the utterance to child handlers.

6. (original) The method as recited in claim 1, further comprising the step of submitting unresolved utterances to winning handlers of a previous utterance for decoding.

7. (original) The method as recited in claim 1, further comprising the step of maintaining a database of a history of handler selections.

8. (original) The method as recited in claim 7, wherein the history includes time based ordering and ontological information.

9. (original) The method as recited in claim 7, further comprising the step of resolving unresolved utterances by employing information stored in the database.

10. (original) The method as recited in claim 1, wherein the step of decoding further includes executing a command in accordance with the winning handler, responsive to the utterance.

11. (previously presented) A computer-readable medium, tangibly embodying a program of instructions executable by a computer to perform method step for recognizing commands in natural language as recited in claim 1.

12. (previously presented) A method for recognizing commands in natural language, comprising the steps of:

providing a plurality of handlers trained to be responsive to given utterances;

arbitrating against results provided by at least two of the plurality of handlers to determine a winning handler for an utterance, wherein the results provided at a first stage by at least one of the at least two of the plurality of handlers include one or more target utterances for the utterance; and

decoding the command in accordance with the winning handler.

13. (original) The method as recited in claim 12, further comprising the step of resolving ties in the arbitration between handlers by employing a tie-breaker handler.

14. (original) The method as recited in claim 13, wherein the tie-breaker handler poses a question to a user to determine the winning handler.

15. (original) The method as recited in claim 12, wherein the handlers include an enabled or a disabled state and further comprising the step of presenting the utterance to enabled handlers.

16. (original) The method as recited in claim 15, further comprising the step of submitting the utterance to disabled container handlers to ensure submission of the utterance to

child handlers.

17. (original) The method as recited in claim 12, further comprising the step of submitting unresolved utterances to winning handlers of a previous utterance for decoding.

18. (original) The method as recited in claim 12, further comprising the step of maintaining a database of a history of handler selections.

19. (original) The method as recited in claim 18, wherein the history includes time based ordering and ontological information.

20. (original) The method as recited in claim 18, further comprising the step of resolving unresolved utterances by employing information stored in the database.

21. (original) The method as recited in claim 12, further comprising the step of executing a command in accordance with the winning handler, responsive to the utterance.

22. (previously presented) A computer-readable medium, tangibly embodying a program of instructions executable by a computer to perform method step for recognizing commands in natural language as recited in claim 12.

23. (previously presented) A system for recognizing commands in natural language,

comprising:

a speech recognizer for decoding language and semantic information in utterances provided by a user; and

a dialog manager comprising a hierarchical ordering of handlers, each handler being trained to be responsive to decoded utterances wherein the dialog manager manages arbitration between results provided by the handlers to determine a winning handler for an utterance and decodes the command in accordance with the winning handler, wherein the results provided at a first stage include one or more target utterances for the utterance.

24. (original) The system as recited in claim 23, wherein the handlers include at least one tie-breaker handler for resolving ties in the arbitration between handlers.

25. (original) The system as recited in claim 24, wherein the tie-breaker handler poses a question to a user to determine the winning handler.

26. (original) The system as recited in claim 23, wherein the handlers include an enabled or a disabled state and the utterance is presented to enabled handlers or disabled container handlers with child handlers.

27. (original) The system as recited in claim 23, further comprising a database for storing a history of handler activities.

28. (original) The system as recited in claim 27, wherein the history includes time based ordering and ontological information.

29. (original) The system as recited in claim 27, further comprising at least one clarification handler, which resolves unresolved utterances by employing information stored in the database.

9. RELATED EVIDENCE APPENDIX

None.

10. RELATED PROCEEDINGS APPENDIX

None